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Technology Integration in Teaching Action Research

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Abstract

This article describes an instructional model designed to teach action research to undergraduate preservice teachers which uses technology integration to facilitate the learning process. I begin with a theoretical overview of the instructional design then describe the instructional model. Finally, I present an analysis of the outcomes of the course and present implications for future revisions in the course.

Introduction

In teaching an undergraduate student teaching seminar, an action research assignment was chosen as the central feature of the course. Action research has been defined as "... the process by which practitioners attempt to study their problems scientifically in order to guide, correct, and evaluate their decisions and actions." (Corey, 1953). The three step process involves (1) planning; (2) taking actions; and (3) fact-finding about the results of the action (Lewin, 1946). Although in existence for many decades, this practice has regained interest in teacher development and is currently used by teachers to improve their practices. Teacher educators are using it as a tool for the promotion of reflectivity as a habit of mind.

The purpose of the action research assignment was to facilitate the integration between theory and practice while promoting critical and reflective thought that would lead to the development of practice that is based on systematic inquiry. However, being undergraduate students with limited or no exposure to a research paradigm, it was particularly problematic to teach the action research process while having the students engage in the inquiry within a one semester course. After, a pilot study during one semester to develop instructional practices for the assignment, it became apparent that the students may be able to successfully complete the assignment if supported through continuous feedback in the various stages of the process.

This instructional model evolved as an action research project on the use of action research with student teachers, which was influenced by the work of the Action Research on Action Research project at the University of Wisconsin Madison (Nofke & Zeichner, 1987). However, although the assignment is similar in purpose, particularly in the attempt to impact teachers' habits and skills as they are inducted to the teaching profession, the developing model is different due to several factors such as the context, student demographics, and the use of online instructional methods to stimulate reflective and thoughtful teaching through action research. Thus the instruction was developed systematically through a reflective process where method was developed from analysis of the impact of the instructor's pedagogical actions on student outcomes. After one semester of teaching the course, the model that emerged made use of technology to provide different levels of interaction as a way to facilitate the learning of a complex process. Important features in considering the instructional design included learner control, access and levels of interaction.

Theoretical Framework and Instructional Design

The instructional design was based on decisions made by the instructor with considerations regarding the resources available and the learner needs. Online learning requires specialized application of learning theories to optimize learning. At the core of the theoretical principles which lay at the foundation of the instructional design are the social constructivist theories of Vygotsky, which explain learning as the result of development which leads the learner to a higher level of ability through social interaction. Specific in this course was a concern to create spaces for critical discourse

and interactive learning experiences. Thus computer mediated communication (cmc) was a major vehicle for moderated critical discourse with the purpose of developing new understandings of complex processes (Kaye, 1987).

The design also applied the principles developed by Garrison, Anderson and Archer (2000) where a community of inquiry was created through the use of Webct as the medium of communication for the class. Asynchronous online discussions and e mail use were structured into the course assignments in addition to text based online modules. This combination provided for educational experiences with three levels of presence, social, cognitive and teaching presences along with a setting and discourse that provided the support for the learner. The Webct structured assignments also contained the three levels of interaction described by Moore (1989): student-teacher, student-student and student-content interactions.

A previous study demonstrated that requiring multiple responses in a critical manner may lead students to reach higher levels of critical thinking, which optimizes learning and meaning making of complex content. (Ostorga & Yanes, 2007). Therefore, multiple responses were required in all online discussions.

Other principles of importance in the instructional design included concerns for learner control and access. Given the demographics and the setting the course, this course, originally characterized as a f2f course, was modified to a hybrid model approach. Thus, in exchange for web enhancements, students were only required to meet every other week. The time off from f2f allowed for more learner control since students could organize their coursework to fit around their busy schedules. Yet,

experience with the student population revealed that this student population did not demonstrate a readiness to engage in full distance learning. A study done at the university revealed that access to technology did not necessarily increase its use (Peña, Curts & McWright, 2007). Informal dialogue with students reveal that the issue of access is quite complex ranging from lack of financial resources to purchase computers that are capable to handle the latest technological advances to lack of resources in the community with respect to connectivity or processing speed. So the hybrid model appeared to be the most appropriate approach. In addition, due to possible problems with connectivity, the webct course components were limited to text based information, online discussions and e mail. Webct 4.1 was the available platform at the time.

Method

The study was developed at the University of Texas Pan American located geographically along the Texas/Mexico border. 87% of our students are first generation college students, of Hispanic origin (mostly Mexican-American), dependent on federal financial aid for their education. Another unique feature of the context is the nature of the community, which is officially recognized as a metropolitan statistical area (Geffen, 2003). This category created by the federal Office of Management and Budget defines geographical areas of high population density generally recognized as urban. This categorization may lead to erroneous assumptions about the nature of the setting. As an area of rapid population and economic growth, it has reached the population density required for such a categorization. However, there are pockets where the lack or

resources still make portions of this region similar to a rural area. In terms of technology resources, connectivity and access to internet are often limited.

The participants in this study consisted of students in a student teaching seminar for preservice teachers designed to promote an understanding of the application of theory into practice. Of the 27 students who participated and completed the assignment, 17 were women and 10 men. 24 were of Mexican origin or descent, 1 was African American and 2 were white Caucasian. All the students were enrolled in a teacher preparation program but their major content areas differed. 23 of the 27 students were in the All level program for kinesiology majors. As such they were preparing to become health and physical education teachers. Of the remaining students, 3 were preparing to become middle school teachers in the area of mathematics and one was preparing to become a high school teacher of Social Studies.

Instructional Model

The course was a student teaching seminar, which consisted of biweekly face to face discussions based on textbook and readings that focused on the integration of pedagogical and professional competencies for teachers and the use of action research in the classroom. A portion of the face to face class time was devoted to instruction and discussion of the action research assignment. The course was enhanced with web based instruction which took place during the weeks when students did not meet face to face. The web enhancement was a practical way to allow for continuous space where dialogue and support could take place.

Through Webct, students had access to a series of 6 modules that guided them through the inquiry process, statement of the problem, literature review, method (plan of action and data collection), data analysis, conclusion and final project. The modules included explanations, examples and links to web sites for further clarification. At the end of each module, students were required to post responses on a discussion board. An initial prompt was posted by the instructor which allowed for students to discuss their own work as it related to the module. They could either share their ongoing work to the group with clear description of what they were doing and why or they could present their ideas and ask the group for help on issues and problems they were facing with the inquiry process. These discussions were timed so that students interacted in the online medium during the weeks when the class did not meet. In addition to the modules and web discussions, students were encouraged to email their questions and concerns directly to the instructor's e mail, especially on those issues that required a more prompt response. This means that the work of each module comprised of online text based information, self instruction and online discussions.

Another important component of the course was that students were required to submit an assignment for grade at the end of each module. Because the inquiry process requires that careful procedures be carried out across a time frame. The assignment insured that the inquiry was carried out in a continuous manner, rather than have the work rushed at the end of the semester. In other words, students submitted part of their inquiry project every 2-4 weeks. These assignments were assessed formatively and graded. The feedback included suggestions for revisions. The sixth module consisted in

instructions to complete the final research paper. In this last assignment, students combined the modular assignments into one research paper with the suggested revisions for a final grade. Weight of the assignments took into consideration that students were learning a difficult process that required multiple attempts. Therefore, the first five modular assignments, which represented parts of the final paper, carried much less weight (5% of the grade for each module) than the final paper (20% of the total grade).

Levels of Interaction in the Instructional Model

The various activities in the completion of the action research project combined the use of three levels of interaction developed by Moore (1987) in every phase of the assignment. Figure 1 shows the levels of interaction present in each phase of the assignment. Each phase involved the use of F2F instruction where the students interacted with the professor and each other. Each learning module included the use of hypertext and selected readings which will be categorized as student-content interaction. There was also a level of student-instructor interaction in the learning modules because a portion of the reading material was instructor created in a conversational tone. However, because the interaction was unidirectional, instructor to student and did not allow for student to question the instructor while reading the material, this component will be only categorized as student-content interaction. In addition to F2F instruction and learning module readings, students were required to engage in online discussions; this provided the level of student-student interaction. It is important to note here that the way the online discussions were set up made interaction a requirement. A previous study demonstrated that requiring multiple responses in a

critical manner may lead students to reach higher levels of critical thinking, which optimizes learning and meaning making of complex content. For this reason, students were required to post an initial response to the instructor's prompt, then reply to 2 or 3 other students. The responses to other students could be a moral support in agreement with what was said by a student, or it could be some suggestions to help their peers resolve issues or clarify questions.

Insert Figure 1 here

Findings

Evaluation of the effectiveness of the technological integration and instructional design is based on an analysis of the student engagement in the course and level of success in learning the content of the major assignment. Of the 30 students who began the course, 27 completed the assignment successfully. The assignments showed significant amount of all of Moore's levels of interaction.

Student-Content interaction

The webct site contained data regarding the number of times and length of time students accessed each page. The six learning modules comprised a total of 470 times. (Table 1)

Insert Table 1 here

The results show that students made use of modules through repetitive use. The first module was accessed a total of 146 times. Given that there were a total of 29 students at the beginning of the semester, this means that students accessed this module

on average about 5 times. This is significantly more than the other modules which were accessed about 2 or 3 times. A close analysis of the tracking record shows that 2 students did not access the page at all. These were the students who had the most difficulty and eventually dropped out of the course. Not only did the records demonstrate a high frequency of hits for each learning module, but it also shows that students spent time during each hit. The tracking records show a total of 197 hours and 22 minutes, with an average of 12:36 minutes per hit.

Student-instructor Interaction

Student-teacher interactions took place during f2f instruction, e mails and online discussions. E mails messages numbered 649, of which, 268 messages were sent by students to the instructor. Most of these included messages with questions about assignments. The participation of the instructor in online discussions was intentionally minimized in the initial phase of each online discussion to encourage student participation without the influence of the authority of the instructor. Nevertheless, the instructor participated by responding to selected postings based on a need for clarification that could not be provided by peers, or encouragement that promoted the building of trust in the students so that they could feel free to express their ideas. One particular student played a significant role in creating a human atmosphere in the online discussions. She responded to everyone and initiated some discussion

topics in the discussion board. The instructor, responded to one of her questions by acknowledging her contributions. Here is that response:

“F, first I would like to say that I really enjoy your active participation in the discussion board. Secondly, I want to point out that if you feel your question is too broad you are welcome to narrow it down. This is the beauty of action research; you can make adjustments as you go along to improve your inquiry. In the long run, a more focused question will lead to deeper understanding.”

Student-Student Interaction

The level of student interaction reveals that student-student interaction was a significant part of the course. There were 5 required discussions requiring a total of 10 responses. There were two free topics where students interacted about issues not related to the assignments. One of the threads involved the planning of a party on the last day of class. These were all graduating seniors and they wanted to celebrate their accomplishment. The space for online dialogue along with the face to face classes created a cohesion within the group.

During the discussions, the instructor’s presence was maintained in the dialogue to insure a focus on the topic. However, instructor’s interaction with students was minimized at the initial phase of each discussion, leaving the space for students to help each other. Instructor made sure to respond to questions that were left unanswered in the course of the discussions. As a result, a great deal of the support was provided from

peers which strengthened the quality of the dialogue and promoted the development of their own voice. The online discussions generated a total of 450 messages. (see Table 2)

Insert Table 2 here

The first and last discussion only required one response from each student. Module 2 however required 2 responses and modules 3 and 4 required four responses. In these three modules, students were required to respond to each other in addition to responding to the professor. The interaction among students provided support and scaffolded learning toward higher levels of thinking. The requirement to make multiple responses to online discussion, led to the formation of a space for continuous dialogue and feedback. as a result, students went beyond the requirements.

Module 3, the most complex, led to a total of 110 responses. Students talked openly about their problems in understanding the assignment, or in making decisions about what to do next. Here is an example of a posting where the student was asking for help:

“I would really appreciate some help on those that are doing their research on classroom management. How exactly do we collect this data?”

This module was the hardest because the students could not grasp the idea that they were going to act like researchers. Here is a posting from one student who was confused with this unfamiliar task:

“I am currently putting data together from different websites that I have looked in to. What I did to find some of the data is type my

topic/statement of the problem in to different search engines and got a lot of different data information on it”

The confused students were helped by others who understood what had to be done. In essence, the responses from more able students served as a scaffold in the process of learning the action research activities. Here is one example:

“Well, let me tell you that your plan sounds good, but the only thing that you are doing wrong is that you are not supposed to collect data from websites nor library. You are going to collect data from your actual students. The ones you are working with in your student teaching. There are many ways that you can use to collect data. You can use surveys, journals, student-teacher discussions, interviews with your students, etc. If you go to WebCT, Dr. (author) has posted the many ways we can collect data from our students. Whatever your concern is with classroom management in your classroom, you are going to use it to help you in collecting the data from your students.”

There was also evidence of dialogue that led to a deeper understanding of the issues of practice and of their own values about practical and philosophical issues. In some instances, the online medium was used to articulate deep reflections. Here is an example:

“My statement of the problem was *Teacher-student relationships and how to maintain respect and control in a friendly environmet*. I have been having a hard time thinking of ideas on how to either to assess or collect data in a formulated way. I’ve been using my judgment and common sense on dealing with my students but how would I log that down?”

There were numerous instances where the clarification provided by a peer helped the student to develop a better understanding of the task:

“I think you have a great idea. F's idea is also really good. You both seem to be on the right track. I think using a questionnaire is probably going to be effective. I am personally thinking of using questionnaires as well, I just hadn't thought of how to make it to where their answers would pertain specifically to my paper. Yours and F's ideas really helped me. Thanks.”

An analysis of the student-student dialogue shows that this was an important component of the instructional model. Student mediated dialogue provided the means for understanding the unfamiliar tasks and led students to think critically about the issues that were important to them.

Conclusions

The instructional model for teaching action research is still in a development stage. In its current design, the model was successful due to the central role of interaction among students which was mediated by the use of technology. Based on this finding, I am currently exploring ways to make use of technology to promote higher

levels of critical thinking in the action research assignment. Among the modifications being considered is the use of collaborative action research assignments where students can collaborate in a single inquiry project.

The implications of this study suggest that an instructional design that is orchestrated in a systemic approach based on the context of the student population can be an effective way of promoting learning that is mediated by different levels of interaction. Computer mediated communication offers a practical means of facilitating the learning of a complex task such as the action research process.

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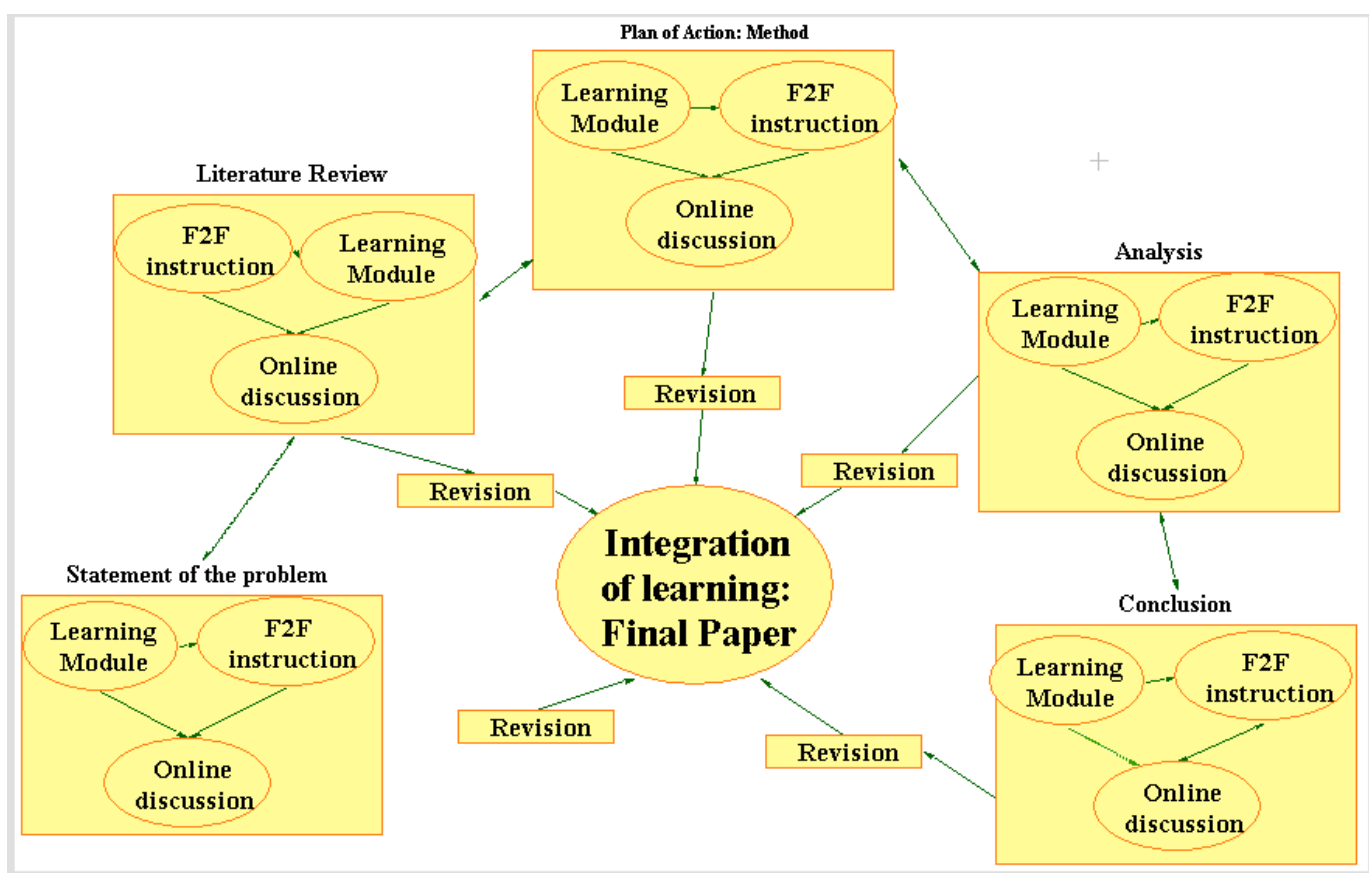


Figure1. : Instructional Model for teaching Action Research

Module	Number of times Accessed
Module 1	146
Module 2	82
Module 3	68
Module 4	62
Module 5	74
Module 6	38
Total	470

Table 1 of Student-Content interaction

Discussion	Required responses	Total responses	Average per student
Module 1	1	84	3.1
Module 2	2	87	3.2
Module 3	3	110	4.1

Module 4	3	94	<i>3.4</i>
Module 5	1	33	<i>1.2</i>
Free topics 2 threads	0	42	<i>1.6</i>
<i>Total</i>	<i>10</i>	<i>450</i>	<i>16.7</i>

Table 2 Evidence of student-student interaction